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MARKING SHEET
[Makingu Shito]

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Specification

1. Title of the invention

Marking sheet

2. Patent Claims

1. A marking sheet which is a marking sheet in possession of a marking substrate wherein an application sheet has been temporarily adhered to the upper plane thereof and wherein a peelable paper has been pasted, via a tackifier layer, onto the lower plane thereof and is characterized by the configuration of through-holes with diameters of 0.2 ~ 1.0 mm punching through the aforementioned marking sheet at intervals of 1 ~ 10 mm.

2. A marking sheet mentioned in Claim 1 wherein said application sheet is devoid of through-holes.

3. A marking sheet mentioned in Claim 1 wherein said peelable paper is devoid of through-holes.

4. A marking sheet mentioned in Claim 1 wherein said application sheet and peelable paper are devoid of through-holes.

5. A marking sheet mentioned in Claim 1 devoid of said application sheet.

6. A marking sheet mentioned in Claim 1, 2, 3, 4, or 5 wherein said through-holes have been formed by means of a punching work.

7. A marking sheet mentioned in Claim 1, 2, 3, 4, or 5 wherein said through-holes bear circular or elliptical shapes.

3. Detailed explanation of the invention

(Industrial application fields)

The present invention concerns a marking sheet used for marking exteriors of vehicular frames of various transportation vehicles, machines, [other?] vehicles, etc., for outdoor billboards, for the marking and displays of store interiors, etc.

(Prior art)

A marking sheet known in the prior art may, on an occasion marking the exteriors of vehicular frames of transportation vehicles, machines, etc., for example, be used for a specified marking operation by removing a peelable paper pasted onto the adhesion plane of a specified marking sheet and by pasting the remainder to the aforementioned adhesion target plane via a tackifier, whereas local peels or bulges may arise on an occasion for pasting the marking sheet due to the entrapment of air, etc. in-between said sheet and the adhesion target or to the generation of a gas, etc. from

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the adhesion target upon the completion of pasting, as a result of which not only does the physical appearance become

tarnished but a grave endurance loss also occurs. For the purpose of eradicating these inconveniences, a method wherein [a marking sheet is?] pasted in a state where the surface thereof is being pressed with a mobile pasting tool (e.g., spatula, etc.) is being used, although it is extremely difficult to achieve a homogeneous adhesion contiguity over the entire plane, and furthermore, advanced skills and considerable labor and time burdens are required for realizing this goal. The following embodiments have, for example, been conceived for the purpose of eradicating these shortcomings: One wherein air release holes are configured on a tackifier layer-laminated substrate constituting a marking sheet, one wherein the aforementioned substrate is formed by gas-permeable fibers, one wherein a gas-permeable porous layer comprising of a foam, paper, etc. is configured in-between a substrate and a tackifier layer, one wherein a foamy porous tackifier layer is formed, one wherein a continuous porous plastic film bearing an average pore size of $2 \sim 50 \mu\text{m}$, a gas transmission rate of $2 \text{ sec}/100 \text{ cc} \sim 120 \text{ sec}/100 \text{ cc}$, and a thickness of at least $20 \mu\text{m}$ is used as the aforementioned substrate, etc., although they have yet to yield fully satisfactory results in terms of gas permeability, endurance, operative efficiency, manufacturing difficulty, etc. In a case where holes are punched through by using a hole drilling tool with a sharp tip for the purpose of configuring air release holes on the aforementioned substrate, furthermore, not only do splinters, wraparounds,

depressions and protrusions, etc. arise on the circumferential walls of such holes but the bottoms of the same also become cracked, etc., due to which such accidents as peeling, etc. are likely to arise upon the completion of pasting.

(Problems to be solved by the invention)

The objective of the present invention is to provide [a marking sheet?] bearing a moderate gas permeability and capable not only of facilitating a contiguous total plane adhesion but, by virtue partially of the shapes, etc. of concomitantly formed gas-permeable holes, also of yielding markings with excellent endurances and favorable physical appearances.

(Mechanism for solving the problems)

The aforementioned objective is achieved according to the present invention by arraying, at intervals of 1 ~ 10 mm, preferably 5 ~ 10 mm, through-holes with diameters of 0.2 ~ 1 mm, preferably 0.5 ~ 0.8 mm, punching through either the entirety of a laminate comprising of a marking substrate wherein an application sheet has been temporarily adhered to the upper plane thereof and wherein a peelable paper has been pasted, via a tackifier layer, onto the lower plane thereof, the portion of the aforementioned laminate other than said application sheet, the portion of the aforementioned laminate other than said peelable paper, or the portion of the

aforementioned laminate other than said application sheet and peelable paper. Said through-holes may be configured in a zigzag array, lattice-shaped array, etc. (Figure 6A and B), whereas said zigzag array is favorable from the standpoint of mitigating the generation of streaks on a printing occasion.

Moreover, the aforementioned through-holes may be formed by means of a punching work, whereas said through-holes may, furthermore, be formed to bear circular or elliptical shapes.

As far as the present invention is concerned, through-holes with diameters of 0.2 ~ 1.0 mm are arrayed at intervals of 1 ~ 10 mm, based on which it becomes possible, even in a case where air has become trapped in-between a marking sheet and a marking and adhesion target on an occasion for pasting the former onto the latter, to achieve a contiguous adhesion state with ease by evacuating air through said through-holes and to facilitate a work yielding a favorable finished physical appearance accompanied by neither peels nor bulges. In a case where hole diameters exceed said range, a tackifier fluidizing tendency becomes prominent, and since hole diameters become constricted, the gas permeability becomes hindered, accompanied by the invasions of water and other harmful liquids, harmful gases, dirt and dust, etc. through the holes, as a result of which the endurance becomes exacerbated due to the degradation of the adhesion plane, and undesirable physical appearances such as the conspicuity of holes, baring of the base, etc. become unavoidable. In a case where the diameters are smaller than said range, furthermore,

the gas permeability becomes insufficient, and it becomes difficult to open holes by means of a punching work. Moreover, in a case where the interval in-between holes exceeds the aforementioned range, it becomes difficult to smoothly evacuate air, gases, etc. trapped in-between holes, whereas in a case where the same is below the aforementioned range, it becomes difficult to open holes by means of a punching work.

Through-holes, furthermore, are formed to bear circular or elliptical shapes, preferably perfectly circular shapes or circular shapes nearly perfect, whereas on such an occasion, holes are formed by means of a punching work using sharp cyclic blade molds bearing shapes analogous to those of the aforementioned holes (Figures 8A and B), based on which it becomes possible to avoid the persistence of splinters, depressions and protrusions, etc. on through-hole wall planes as well as cutting debris (e.g., wraparounds, etc.) on circumferential edges of through-holes, and since factors contributing to such accidents as cracks, peels, etc. can be eradicated, markings with further improved endurances and physical appearances can be obtained.

(Application examples)

Application examples will be explained with reference to figures; in Figure 1, an application sheet (2) made of a transparent or semi-transparent paper, plastic film, etc. is temporarily adhered to the upper plane of a marking substrate

(1) via a slightly tacky or re-peelable tackifier (3) for temporary adhesion, whereas a tackifier layer (4) made of a conventionally known tackifier of the acrylic, rubbery, or silicone type, etc. is configured on the lower plane of the aforementioned marking substrate, whereas a material to be used as a marking sheet is formed by temporarily adhering a peelable paper (5) to said tackifier layer. The aforementioned marking substrate (1) can be formed by a specifiably colored plastic film or a corresponding film wherein the surface thereof has been specifiably coated with a certain color, characters, emblems, patterns, etc. Moreover, it is also possible to use an ink film formed by printing an acrylic resin, urethane resin, polyester, polyolefin, polyvinyl polymer, ethylene-vinyl acetate copolymer, etc. with a specifiably colored printing ink based

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on a conventionally known printing method (e.g., screen printing, offset printing, flexo printing, gravure printing, etc.) or ordinary coating method, etc.

Configured on this material at hole-to-hole intervals of approximately 5 ~ 10 mm are through-holes (6) with hole diameters of approximately 0.6 ~ 0.8 mm punching through said laminate. A punching work is executed by using an upper mold (press mold) (11) on which large numbers of blade molds (11a) in possession of sharp cyclic blade tips equivalent to to-be-punched hole diameters are arrayed at the aforementioned interval and a lower mold (reception mold) (12) on which hole

molds (12a) corresponding to said blade molds are likewise arrayed for receiving said blade molds (Figure 8A), based on which the targeted through-holes (6) (Figure 7) become formed.

The marking sheet of Figure 3 is formed according to procedures virtually similar to those for forming its counterpart of Figures 1 and 2 except that no through-holes are configured on an application sheet (2) in possession of a tackifier (3) for temporary adhesion, whereas the sheet of Figure 4 is formed according to procedures virtually similar to those for forming its counterpart of Figures 1 and 2 except that no through-holes are configured on a peelable paper (5), whereas the sheet of Figure 5 is formed according to procedures virtually similar to those for forming its counterpart of Figures 1 and 2 except that no through-holes are configured on a marking substrate (1) and a tackifier layer (4). The respective sheets can be similarly used. It is conceivable to configure, on the application sheet, tabs (e.g., lengthwise, widthwise, or lengthwise and widthwise, etc.) serving as guidelines of pasting positional relations on an occasion for applying this marking sheet to an adhesion target for the purpose of facilitating a pasting operation. It is also conceivable, as has been mentioned earlier, not to laminate an application sheet on the marking sheet.

(Effects of the invention)

Based on the above-mentioned constitution of the present invention, utterly no splinters, depressions and protrusions, etc. exist on the circumferential edges of through-holes, and factors contributing to cracks, peels, etc. are absent; moreover, air, etc. trapped in-between [the marking sheet?] and adhesion target on an occasion for applying [said sheet?] to the adhesion target can be easily released through the through-holes, based on which a homogeneous adhesion contiguity can be achieved over the entire plane, whereas utterly no local bulges arise on the marking plane, accompanied by the absence of splinters, cracks, etc. on the circumferential walls of the aforementioned through-holes, based on which markings bearing excellent endurances and physical appearances can be easily provided.

4. Brief explanation of the figures

Figures show application examples of the present invention, and of these, Figure 1 is a partial oblique view diagram, whereas Figure 2 is a diagram which shows a cross-sectional view of the II-II line in Figure 1, whereas Figure 3 through Figure 5 are diagrams which show cross-sectional views of modified examples, whereas Figures 6 (A) and (B) are diagrams which show plane views of arrayed through-holes, whereas Figure 7 is a magnified cross-sectional view diagram provided for explaining through-holes, whereas Figures 8 (A) and (B) are abstract demonstrational diagrams provided for explaining hole punching molds.

(1): Marking substrate; (2): Application sheet; (3): Tackifier for temporary adhesion; (4): Tackifier layer; (5): Peelable paper; (6): Through-holes.

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Figures 1-8

